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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/525,847	02/25/2005	Mitsuo Tsukamoto	Q85912	2196
23373 7590 01/25/2008 SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			EXAMINER WU, IVES J	
			ART UNIT 1797	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/525,847

Applicant(s)

TSUKAMOTO ET AL.

Examiner

Ives Wu

Art Unit

1797

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 November 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 5-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1 <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2 <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3 <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

- (1). Applicants' Amendments and Remarks filed on 11/28/2007 have been received. Claims 1 and 2 are amended. Claim 4 is cancelled. Accordingly, the rejection of claim 4 in prior Office Action dated 08/09/2007 is removed. The rejections of claims 1 and 2 are revised in response to the present Amendments and presented together with rest claims in the following.

Claim Rejections - 35 USC § 102/103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

- (2). **Claims 1, 5-12, 18, 20 and 22** are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Saito et al (US06716942B1).

As to step of polymerizing a radical polymerizable monomer in a manner of continuous polymerization in a defined reaction-field to give fluoropolymer avoiding the use of carbon dioxide in a fluoropolymer producing method in **independent claim 1**, Saito et al (US06716942B1) disclose process for producing fluoropolymer (Title). At least one of components forming the reaction field is in supercritical state (Abstract, line 6-7). The process for preparing a fluoropolymer by polarizing one or more radically polymerizable monomers comprises at least one fluoroolefin monomer substantially in the absence of water (Col. 2, line 53-56). The polymerization of radically polymerizable monomer is carried out by any of batchwise, semi-batchwise and continuous mode (Col. 7, line 28-30). Saito et al do not disclose the use of carbon dioxide as medium in the teaching.

As to defined reaction-field to be in a supercriticality-expression state and under a pressure of not higher than 40 MPa and a temperature of not higher than that higher by 100 C than the supercriticality-expression temperature of the defined reaction-field in a fluoropolymer producing method in **independent claim 1**, Saito et al disclose the whole pressure in polymerization system to be 40 MPa or less in an absolute pressure and at least one of the

monomers is in supercritical state (Col. 2, line 58-60). A polymerization temperature is from 10 °C to 200 °C (Col. 8, line 37-38).

As to supercriticality-expression state to be formed in one-component systems in which one kind of a radical polymerizable monomer exists, or in multi-component systems in which two or more kinds of radical polymerizable monomers exists in a fluoropolymer producing method in **independent claim 1**, Saito et al disclose the in case of using no fluorocarbon and using one monomer, a reaction field in a state exceeding both the critical pressure and critical temperature of the monomer. In case of using no fluorocarbon and using two or more monomers, a reaction field in a state exceeding both of the lowest critical pressure and lowest critical temperature of those monomer (Col. 3, line 20-27).

As to radical polymerizable monomer comprising a fluorine-containing ethylenic monomer in a fluoropolymer producing method in **independent claim 1**, Saito et al disclose vinylidene fluoride (Col. 4, line 21).

As to a ratio $[M_w/M_n]$ of the weight average molecular weight $[M_w]$ on the styrene equivalent basis to a number average molecular weight $[M_n]$ of the fluoropolymer on the polystyrene equivalent basis to be higher than 1 but not higher than 3 in a fluoro-polymer producing method in **independent claim 1**, Saito et al disclose the Examples which shows the ratio to be around 2.

As to fluoropolymer having a weight average molecular weight $[M_w]$ of not lower than 150,000 as determined on the polystyrene equivalent basis in a fluoropolymer producing method in **independent claim 1**, Saito et al disclose the molecular weight of the polymer to be adjusted to a desired weight by chain transfer agent (Col. 6, line 55-57). An amount of the chain transfer agent may be optionally determined depending on a desired molecular weight of the polymer (Col. 7, line 11-13). Although Saito et al disclose the Example 2, which shows the weight molecular weight 40,000. It is well known in the art that long reaction times are also necessary for both high percent conversion and high molecular weight (page 199, Principles of Polymerization, 4th Ed., George Odian). In view of the substantially identical polymerization reaction field disclosed by Saito et al and by applicants, it is examiner's position to believe that the supercriticality-expression state of Saito et al would inherently possess the capability of

producing weight average molecular weight of the fluoropolymer to be not lower than 150,000 as claimed. Since USPTO does not have proper means to conduct the experiments, the burden now is shifted to applicants to prove otherwise. *In re Fitzgerald*, 205 USPQ 594 (CCPA1980).

As to defined reaction-field having a ratio $[\rho_m/\rho_o]$ of not lower than 1.1 in **independent claim 1**, in view of the substantially identical polymerization reaction field disclosed by Saito et al and by applicants, it is examiner's position to believe that the supercriticality-expression state of Saito et al would inherently possess the capability of producing reaction-field having ratio of $[\rho_m/\rho_o]$ of not lower than 1.1 as claimed. Since USPTO does not have proper means to conduct the experiments, the burden now is shifted to applicants to prove otherwise. *In re Fitzgerald*, 205 USPQ 594 (CCPA1980).

(2). The same rationale of rejections for **claims 5-12, 18, 20 and 22** are recited in prior Office Action dated 08/09/2007.

(3). **Claims 2-3, 13-17, 19, 21 and 23** are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over DeSimone et al (US06716945B2).

As to step of polymerizing a radical polymerizable monomer in a manner of continuous polymerization in a defined reaction-field in the presence of carbon dioxide amounting to 10% or less of the total number of moles of carbon dioxide and radical polymerizable monomer to give the fluoropolymer in a fluoropolymer producing method in **independent claim 2**, DeSimone et al (US06716945B2) disclose a method for forming a fluoropolymer comprising providing a reaction mixture comprising carbon dioxide, at least one fluoromonomer, and an initiator (Abstract, line 1-6). The method can be carried out batchwise, semi-continuously or continuously with through mixing of the reactants in any appropriately designed reaction vessel (Col. 5, line 11-14). In one preferred embodiment, the CO₂ is utilized in a "supercritical" phase. The reaction mixture typically employs carbon dioxide as a continuous phase, with the reaction mixture typically comprising from about 1 to about 99 wt% of carbon dioxide (Col. 2, line 42-54).

As to supercriticality-expression state to be formed in one-component systems in which one kind of a radical polymerizable monomer and carbon dioxide exist, or in multi-component systems in which two or more kinds of radical polymerizable monomers and carbon dioxide exist

in a fluoropolymer producing method in **independent claim 2**, DeSimone et al disclose the fluoromonomers maybe in liquid state (Col. 3, line 5-7). In one preferred embodiment, the CO₂ is utilized in a “supercritical” phase (Col. 2, line 53-54).

As to radical polymerizable monomer comprising a fluorine-containing ethylenic monomer in a fluoropolymer producing method in **independent claim 2**, DeSimone et al disclose examples of suitable fluoromonomers including, but not limited to, fluoroolefins and partially fluorinated monomers, particularly vinylidene fluoride, vinyl fluoride (Col. 3, line 14-22).

As to a ratio [Mw/Mn] of the weight average molecular weight [Mw] on the styrene equivalent basis to a number average molecular weight [Mn] of the fluoropolymer on the polystyrene equivalent basis to be higher than 1 but not higher than 3 in a fluoro-polymer producing method in **independent claim 2**, DeSimone et al disclose the fluoropolymer having a weight average molecular weight to number average molecular weight ratio of from about 2 to about 10 (Col. 1, line 51-54).

As to fluoropolymer having a weight average molecular weight [Mw] of not lower than 150,000 as determined on the polystyrene equivalent basis in a fluoropolymer producing method in **independent claim 2**, in view of the substantially identical fluoropolymer producing reaction disclosed by DeSimone et al and by applicants, it is examiner’s position to believe that the fluoropolymer produced by DeSimone et al would inherently possess the Mw of not lower than 150,000 as claimed. Since USPTO does not have proper means to conduct the experiments, the burden now is shifted to applicants to prove otherwise. *In re Fitzgerald*, 205 USPQ 594 (CCPA1980).

As to defined reaction-field having a ratio [ρ_m/ρ_o] of not lower than 1.1 in **independent claim 2**, in view of the substantially identical polymerization reaction field disclosed by Saito et al and by applicants, it is examiner’s position to believe that the supercriticality-expression state of DeSimone et al et al would inherently possess the capability of producing reaction-field having ratio of [ρ_m/ρ_o] of not lower than 1.1 as claimed. Since USPTO does not have proper means to conduct the experiments, the burden now is shifted to applicants to prove otherwise. *In re Fitzgerald*, 205 USPQ 594 (CCPA1980).

(4). The same rationale of rejections for **claims 3, 13-17, 19, 21 and 23** are recited in prior Office Action dated 08/09/2007.

Response to Arguments

(5). Applicant's arguments filed on 11/28/2007 have been fully considered but they are not persuasive.

Applicants calculate the ρ_m / ρ_o in the Examples 1-3 of prior art Saito et al (US06716942B1) and find out that the teaching of Saito et al (US06716942B1) fails to meet the limitations of instant claim 4, in reviewing the teaching of Saito et al (US06716942B1), it recites: Then a solution prepared by dissolving 1.18 g of PERBUTYLI as an organic peroxide radical polymerization initiator in 4.00 g of 2,2,3,3-tetrafluoro-n-propyl alcohol was introduced into a reaction field with nitrogen under pressure to initiate a polymerization. The pressure and temperature in the polymerization reaction field were 5.13 MPa and 120°C., respectively. In these pressure and temperature conditions, since the pressure exceeds P_c of HFP (2.900MPa) and the temperature exceeds T_c of VDF (30.15°C), the formed reaction field was in a supercritical state of the present invention (Col. 10, line 45-56). Therefore, the supercritical states for monomers HFP and VdF is formed, their density would be at least their critical density. Because the nitrogen is used to pressurize the reaction field, the calculation based on vacuum volume of autoclave is questionable to represent the real density of these monomers at their supercritical conditions.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ives Wu whose telephone number is 571-272-4245. The examiner can normally be reached on 8:00 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on 571-272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Examiner: Ives Wu

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Date: January 15, 2008

DUANE SMITH
PRIMARY EXAMINER

[Signature]
1-22-08